

**REMARKS**

Claims 1-26 are pending in the present case. In the Office Communication mailed June 24, 2009, the Examiner made a number of new rejections. For clarity, these are summarized below in the order in which they are addressed herein:

- I.** Claim 15 stands rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention;
- II.** Claim 15 stands rejected under 35 U.S.C. §101 because the claimed recitation of a use allegedly results in an improper definition of a process;
- III.** Claims 1-4, and 7-14 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae et al. (EP 1149573 A2);
- IV.** Claims 5-6 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae et al. as applied to claim 1 above, and further in view of Lehmann et al. (US 6,936,642); and
- V.** Claims 15-26 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae et al. (EP 1149573 A2).

**The Claims Are Not Indefinite**

**I.** Claim 15 stands rejected under 35 U.S.C. §112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. In particular, the Examiner asserts that Claim 15 fails to set for any steps to define the process of using the dental materials. The Examiner further asserts that the claim is an improper multiple dependent claim.

For business reasons and without acquiescing to the Examiner's arguments, and reserving the right to prosecute the original or similar claims in one or more future applications, Claim 15 is amended herein to recite "A process for prosthetic, preservative, or preventive dentistry" and to further recite steps of producing dental material and using the material in dentistry. Reference to Claims 1, 2, and 16 are deleted. The recited steps find support, *e.g.*, in Claims 1, 2, and 16 as originally filed.

Applicants respectfully submit that Claim 15 as amended satisfies the requirements of 35 U.S.C. §112, second paragraph and respectfully request that this rejection be withdrawn.

**The Claims Are Patentable Subject Matter**

**II.** Claim 15 stands rejected under 35 U.S.C. §101 because the claimed recitation of a use, without setting forth any steps involved in the process, allegedly results in an improper definition of a process. Applicants respectfully disagree. Nonetheless, as described above, Claim 15 as amended herein recites "a process for prosthetic, preservative, or preventive dentistry" and further recites steps of producing dental material and using the material in dentistry.

Applicants respectfully submit that Claim 15 as amended satisfies the requirements of 35 U.S.C. §101, and respectfully request that this rejection be withdrawn.

**The Claims Are Not Obvious**

**III.** Claims 1-4, and 7-14 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae et al. (EP 1149573 A2). Claims 2-4 and 7-14 each depend directly or indirectly from Claim 1 and thus contain the features recited in Claim 1.

The examiner states

*"Teramae et al. teaches a dental composite material comprising the polymerizable monomer/organic binder (abstract), and 5-100 nm aggregate particles with 90-10% by weight amount of 5-100 nm aggregate particle size (Paragraph 33,44) which reads nanoparticles weigh and diameter of the instant claim. Further, Teramae et al. teaches that the filler/nanoscale filler is surface treated with silane coupling agent/organically surface-modified (Paragraph 37). Teramae et al. also teaches average particles nm of ZrO<sub>2</sub>/ground filler and 16 nm of ultra fine particle silica/spherical filler (Example 1).*

*In regard to the particle number % of aggregated particles Teramae et al. teaches aggregate of silica nanoparticles (Paragraph 24) which is taken as 100% of nanoparticles are aggregated, and Teramae et al. teaches that desired shape and particle size aggregate are dependent on adjusting temperature, humidity, flow rate of gas etc. (Paragraph 35*

*lines 4-10). Therefore, it would be obvious to one ordinary skill in the art the time of invention was made to have modify aggregate nanoparticles of Teramae et al. to achieve particle number% of nanoscale filler."*

Office communication mailed 6/24/09, pages 3-4.

The Examiner points to Paragraphs 33 and 34 to support an assertion that Teramae teaches filler particles in the size range of those of the instant claims. Applicants respectfully disagree.

Teramae describes using primary particles (used in the preparation of aggregates) of 1 to 250 nm. This is not, however, the particle size of the aggregate particles of the filler taught by Teramae. As stated throughout the reference (*e.g.*, in Paragraph 31, in Example 1 at Paragraph 58, and in Claim 1), the aggregate particles of Teramae have an average particle size of in the  $\mu\text{m}$ -size range. Additional examples include: Claim 1, reciting component B with an average size of **0.5-30  $\mu\text{m}$** ; Example 1 reciting an average aggregate particle size of **3.1  $\mu\text{m}$** ; Example 2 reciting average aggregate particle size of **4.0  $\mu\text{m}$** ; Comparative Example 1 reciting average aggregate particle size of **10.4  $\mu\text{m}$** ; Comparative Example 2 reciting average aggregate particle size of **1.4  $\mu\text{m}$** ; and Example 3 reciting average aggregate particle size of **22.3  $\mu\text{m}$**  (all of these Examples are on page 10).

In regard to the particle number percent of aggregated particles, the Examiner points to the teachings of paragraph 24 as indicating 100 % of the nanoparticles are aggregated. Applicants agree. In paragraph 24, Teramae teaches a composition comprising the heat-treated aggregate (having an average particle size of 0.5 to 30  $\mu\text{m}$ ) and at least one metal oxide. The composition discussed in paragraph 24 does *not* contain unaggregated nanoscale particles. As the only nanoscale particles taught by Teramae are the un-aggregated primary particles, and as the dental material does not contain these un-aggregated particles, it is clear that Teramae does not teach a dental material comprising nanoscale particles as filler.

Thus, while Teramae uses nanoscale primary particles as a starting material in the preparation of micron-scale aggregate particles, and teaches the use of the micron scale

aggregates in dental composite material, Teramae does *not* teach or suggest use of nanoscale particles, *e.g.*, particles smaller than 200 nm as recited in the instant claims, in a dental composite material. Teramae therefore does not teach or suggest the dental materials of the instant claims, which comprise a filler in which *at least 50%* by weight of the particles of the filler are of diameter less than 200 nm.

Further, one of skill in the art would understand that the micron-scale aggregates used by Teramae do not form nanoscale particles during processing of the dental material. As discussed in the Amendment and Response filed on April 8, 2009, primary particles in an aggregate are actually connected to one another (4-8-09 Amendment and Response, page 13), *i.e.*, they cannot fall apart during use, *e.g.*, in dental material. Those of skill in the art understand "aggregate" as having this meaning. See, for example, Section 3.3 of the attached European Standards document, describing standards for pigments and extenders, which defines "aggregate" as "*primary particles so joined together that they cannot be broken down during normal pigment/extender dispersing processes.*" Thus, even if the aggregate particles of Teramae were formed from primary particles of *e.g.*, 1 to 250 nm average diameter, the micron-scale aggregates particles (*e.g.*, 0.5 to 30  $\mu\text{m}$  average diameter) used by Teramae in forming dental composite material cannot downsize into the nanoscale size range during processing of the dental materials.

As the Board of Patent Appeal and Interferences has confirmed, a proper obviousness determination requires that an Examiner make "a searching comparison of the claimed invention – *including all its limitations* – with the teaching of the prior art." See *In re Wada and Murphy*, Appeal 2007-3733, citing *In re Ochiai*, 71 F.3d 1565, 1572 (Fed. Cir. 1995) (emphasis in original). Further, the necessary presence of all claim features is axiomatic, since the Supreme Court has long held that obviousness is a question of law based on underlying factual inquiries, including ... ascertaining the differences between *the claimed invention* and the prior art. *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966) (emphasis added). Indeed, Section 904 of the MPEP instructs Examiners to conduct an art search that covers "the invention *as described and claimed.*" (emphasis added). Lastly, Applicants respectfully direct attention to MPEP §

2143, the instructions of which buttress the conclusion that obviousness requires at least a suggestion of all of the features of a claim, since the Supreme Court in *KSR Int'l v. Teleflex Inc.* stated that “there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.” *KSR Int'l v. Teleflex Inc.*, 127 S. Ct. 1727, 1741 (2007) (*quoting In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

In sum, it remains well-settled law that obviousness requires at least a suggestion of all of the features in a claim. *See In re Wada and Murphy, citing CFMT, Inc. v. Yieldup Intern. Corp.*, 349 F.3d 1333, 1342 (Fed. Cir. 2003) and *In re Royka*, 490 F.2d 981, 985 (CCPA 1974)).

While Applicants do not acquiesce that other elements necessary for establishing prima facie obviousness have been met, Applicants submit that Teramae does not teach or suggest all the features of Claim 1 or the claims depending therefrom. In particular, Teramae does not teach or suggest a dental material comprising a nanoscale filler comprising nanoparticles wherein at least 50% by weight of the nanoparticles have a particle diameter of less than 200 nm. Teramae therefore fails to establish prima facie obviousness of Claims 1-4, and 7-14, and Applicants respectfully request that this rejection be withdrawn.

**IV.** Claims 5-6 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae et al. as applied to claim 1 above, and further in view of Lehmann et al. (US 6,936,642).

Claims 5-6 depend from Claim 1. For the reasons recited above, Applicants submit that Teramae does not teach or suggest all the features of Claim 1 or the claims depending therefrom, *i.e.*, Teramae does not teach or suggest the use of a filler having all of the features recited for the filler b) of Claim 1. Lehman is silent with respect to nanoscale fillers and thus does not cure the deficiencies of Teramae, nor does it suggest modification of the particles of Teramae to comprise smaller particles in a filler. The combination of Teramae and Lehman therefore fails to establish prima facie obviousness of Claims 5-6, and Applicants respectfully request that rejection be withdrawn.

V. Claims 15-26 stand rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Teramae. Claims 17-26 each depend from Claim 16 directly or indirectly and thus contain the features recited in Claim 16. Claims 15 and 16 each recite preparation of a dental material comprising a nanoscale filler in an organic binder wherein at least 50% by weight of the nanoscale filler has a particle diameter of less than 200 nm.

As discussed above, Applicants submit that Teramae fails to teach or suggest a dental material comprising a nanoscale filler wherein at least 50% by weight of the particles of the filler are of diameter less than 200 nm. While Applicants do not acquiesce that other elements necessary for establishing prima facie obviousness have been met, Applicants submit that Teramae does not teach or suggest all the features of Claim 15 or Claim 16, or the claims depending therefrom. Teramae therefore fails to establish prima facie obviousness of Claims 15-26, and Applicants respectfully request that rejection be withdrawn.

## **CONCLUSION**

For the reasons set forth above, it is respectfully submitted that all grounds for objection and rejection have been addressed and Applicants' claims should be passed to allowance. Should the Examiner believe that a telephone interview would aid in the prosecution of this application, Applicants encourage the Examiner to call the undersigned collect at (608) 218-6900.

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